

U.S.S.N. 10,811,621

**Remarks**

Thorough examination by the Examiner is noted and appreciated.

Applicants have amended the Specification as required by Examiner, and thank Examiner for careful examination.

The claims have been amended to clarify Applicants invention.

Support for the new claims is found in the original claims, the Specification and The Figures.

No new matter has been added.

**Claim Objections**

Applicants have amended claims 3, 8, 11, 15, and 18 as required by Examiner, and thank Examiner for careful examination.

**Claim Rejections under 35 USC 112**

Applicants have amended claims 9 and 19 to overcome Examiner rejections and thank Examiner for careful examination.

**Claim Rejections under 35 USC 102**

1. Claims 1 and 2 stand rejected under 35 USC Section 102(a) as being anticipated by Miura et al. (USPUB 2003/0155247).

Miura et al. disclose an electrolyte solution for plating copper to fill vias and trenches on silicon wafers (see Abstract). The electrolyte solution of Miura et al. overcomes the problem of dissolving a seed layer by providing the electrolyte solution at a pH of from 4 to 10 and by providing a complexing agent (see paragraph 0014). Among several other types of complexing agents, Miura et al. teach that **oxyxarboxylic and organic phosphonic acids in the form of salts** may be used (paragraph 0023, 0027, and 0029). Miura et al. teach that the complexing agent **serves the purpose of adjusting the pH of the electroplating solution**. Miura et al. teach that **any type of wetting agent may be added** to the electroplating solution including nonionic surfactants, anionic surfactants, cationic surfactants and amphoteric surfactants (paragraph 0043). Miura et al. teach that the electroplating solution adds to the thickness of the seed layer (paragraph 0051).

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Thus, Miura et al. fail to disclose several aspects of Applicants disclosed and claimed invention.

Nowhere do Miura et al. teach or suggest:

"An **electrolyte bath comprising a suspension layer for forming a wetting layer** on a substrate for copper electroplating, comprising:

an electrolyte solution; and

a composition comprising an organic acid and a non-ionic polymer mixed with said organic acid;

wherein said composition forms a separated suspension layer within said electrolyte solution."

Thus, Miura et al. is clearly insufficient to anticipate Applicants disclosed and claimed invention.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051,

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1053 (Fed. Cir. 1987).

"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Applicants reject Examiners argument that since Miura et al. teach that both an organic acid and a non-ionic polymer may be used as complexing agents **and added to the electroplating solution to control the pH of the electroplating solution**, that it is **inherent** that a suspension layer is formed within the electrolyte as Applicants have disclosed and claimed. Examiner has provided no support for this assertion, and Miura et al. nowhere disclose or teach that such a suspension layer is formed or that it may be used to form a wetting layer on a substrate.

"To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *In re Oelrich*, 666 F.2d 578, 581-582, 212 USPQ 323, 326 (CCPA 1981).

"In relying on the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably

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support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." *Ex Parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

2. Claims 9 and 10 stand rejected under 35 USC Section 102(a) as being anticipated by Miura et al. (USPUB 2003/0155247).

Applicants reiterate the comments made above with respect to Miura et al.

Applicants reiterate that nowhere do Miura et al. disclose an electrolyte bath as Applicants have disclosed and claimed.

Applicants also again reject Examiners assertion that the formation of a suspension layer for forming a wetting layer would be inherent in the electrolyte composition taught by Miura et al.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

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"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

"To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *In re Oelrich*, 666 F.2d 578, 581-582, 212 USPQ 323, 326 (CCPA 1981).

"In relying on the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex Parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

3. Claims 17 and 20 stand rejected under 35 USC Section 102(a) as being anticipated by Miura et al. (USPUB 2003/0155247).

Applicants reiterate the comments made above with respect to Miura et al.

Nowhere do Miura et al. teach or suggest:

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"A method for electroplating a metal onto a surface in an electroplating electrolyte solution, comprising the steps of:

providing a composition mixture comprising an organic acid and a non-ionic polymer;

forming a suspension layer of said composition mixture within said electrolyte solution;

forming a wetting layer on said surface by passing said surface through said suspension layer and into said electrolyte solution; and

electroplating said metal onto said surface."

Nowhere do Miura et al. disclose or suggest **a suspension layer or forming a wetting layer prior to electroplating.**

Applicants also again reject Examiners assertion that the formation of a suspension layer or a wetting layer would be inherent in the electrolyte composition taught by Miura et al.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

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"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

"To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *In re Oelrich*, 666 F.2d 578,, 581-582, 212 USPQ 323, 326 (CCPA 1981).

"In relying on the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex Parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

#### **Claim Rejections under 35 USC 103**

4. Claims 3-8 stand rejected under 35 USC Section 103(a) as being unpatentable over Miura et al., above, in view of Willis (US 4,347,108).



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Applicants reiterate the above comments with respect to Miura et al.

Even assuming *arguendo*, a proper motivation for combining the teachings of Miura et al., and Willis, the further fact that Willis teaches **acidic copper electroplating baths** and that **one or more wetting agents may be incorporated into the plating bath** preferably dissolved in water (see paragraph 10, lines 3-24) including **polyoxyalkylated naphthols** (col 5, lines 39-45), nonionic agents including ether linkages (col 6, lines 9-16), or that amines, alkanols amines, amides, and polyglycol-type wetting agents are known in the art, does not further help Examiner in producing Applicants invention or establishing a *prima facie* case of obviousness.

Applicants further note that the formation of a suspension layer as Applicants have disclosed and claimed would make the complexing agents of Miura et al. **unsuitable for the intended purpose of controlling the pH of the electroplating solution.**

Even assuming *arguendo*, a proper motivation for combination, such combination fails to produce Applicants disclosed and

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claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Examiners arguments directed toward claimed concentrations of Applicants suspension layer (composition), as being optimizable ranges obtainable by routine experimentation is misplaced since, Examiner has not shown several elements of Applicants invention, or any suggestion thereof, in the prior art.

5. Claims 11-16 stand rejected under 35 USC Section 103(a) as being unpatentable over Miura et al., above, in view of Willis (US 4,347,108).

Applicants reiterate the comments made above with respect to Miura et al. and Willis.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The

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teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Examiners arguments directed toward claimed concentrations of Applicants suspension layer (composition), as being optimizable ranges obtainable by routine experimentation is misplaced since, Examiner has not shown several elements of Applicants invention, or any suggestion thereof, in the prior art.

6. Claims 18 and 19 stand rejected under 35 USC Section 103(a) as being unpatentable over Miura et al., above, in view of Willis (US 4,347,108).

Applicants reiterate the comments made above with respect to Miura et al., and Willis.

### **Conclusion**

The cited references, singly or in combination fail to produce Applicants disclosed and claimed invention, and therefore fail to make out a *prima facie* case of obviousness.

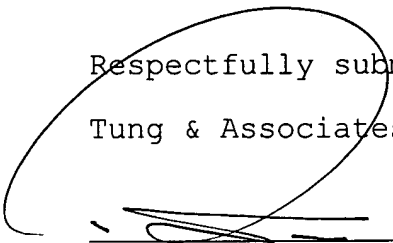
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Applicants have amended their claims to clarify Applicants disclosed and claimed invention. Applicants respectfully submit that Applicants Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention as claimed is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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